UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/540,432	03/31/2000	Gad S. Sheaffer	2207/6849	3939

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EXAMINER
KIM, KENNETH S

ART UNIT	PAPER NUMBER
2181	

DATE MAILED: 07/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
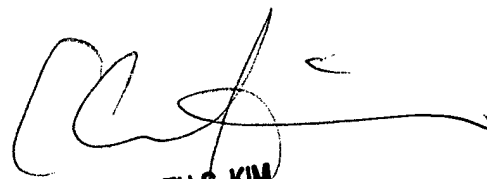- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>09 May 2003</u> .

2a)☒ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-28</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-28</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

KENNETH S. KIM
PRIMARY EXAMINER

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

    If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____ .

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

    a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .

4)☐ Interview Summary (PTO-413) Paper No(s). _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____ .

1.   Claims 1- 28 remain for examination.

2.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly
claiming the subject matter which the applicant regards as his invention.

3.   Claims 1-28 are rejected under 35 U.S.C. 112, second paragraph, as being

indefinite for failing to particularly point out and distinctly claim the subject matter which

applicant regards as the invention.

        Claims 1, 7, 12, 19, and 24, it is not clear what is meant by "steering each of the

set of instructions into an instruction cache according to a particular one of a set of

execution units (or clusters)".

4.   Claims 1-12, 14-24, and 26-28 are rejected under 35 U.S.C. 102(b) as being

anticipated by Sheaffer et al, U.S. patent No. 5,790,822, cited in the previous office

action.

5.   Claims 1, 2, 7, 8, 12, 19, 20, and 24 are rejected under 35 U.S.C. 102(b) as

being anticipated by Branigin, U.S. patent No. 5,471,593, cited in the previous office

action.

6.   The rejections are respectfully maintained for the reasons set forth in the

previous office action, for the added limitations of issuing instructions to particular

execution units or clusters is evident in the references as all instructions are issued to

appropriate execution units for execution.

7.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8.   Claims 12-18 and 24-28 are rejected under 35 U.S.C. 102(e) as being

anticipated by Lipasti, U.S. patent No. 6,219,780, cited in the previous office action.

    Lipasti teaches the invention as claimed in claim 12 including a method of

executing a set of instructions in a processor, comprising:

(a) decoding the set of instructions (70),

(b) steering for a first time each of a set of instructions into an instruction cache (62; col.

7, line 2) according to particular one of a set of execution unit clusters (46) that the

instruction requires,

(c) issuing each of the set of instructions from said instruction cache to a particular one

of said set of execution unit clusters (col. 7, line 23), and

        further teaches as in claims 13-18,

(d) storing each of the set of instructions into a set of bins (fig. 3, 62) in the instruction

cache – claim 13,

(e) renaming a set of register (76; col. 7, line 36) of a particular one of the set of

instructions prior to steering) – claim 14,

(f) scheduling a particular one of the set of instructions if found in the instruction cache

(col. 7, line 23) – claim 15,

(g) steering for the second time into one of a set of execution units and executing (44) –

claims 16 and 17, and

(h) fetching an instruction from memory if not found in the instruction cache (all

instructions are fetched from memory before being stored in the instruction cache) –

claim 18.

The processor claims 24-28 with steering done using crossbar are equivalently

ejected based on the same reason (use of a crossbar to steer multiple locations to

multiple locations is well known in the art).

9.   Applicant's arguments filed May 9, 2003 have been fully considered but they are

not persuasive.

Applicant argued that "Scheaffer" does not teach steering instructions into

instruction cache bins according to a particular one of or cluster of execution unit but

teaches steering into the instruction cache so as to space instructions for the execution

units.

Not all claims recite instruction cache *bins* and the reference teaches not only

spacing instructions based on data dependencies but also steering instructions into

instruction cache bins according to a particular one of execution units (execution

resources). The reference states, referring to Fig. 4,

> "A first selection logic 415 channels the instructions from input buffer 410 to
> separate resource bins 422-426 based on the execution resources needed by

the individual instruction. Once the instructions are channel into the resource bins 422-426, a second selection logic 428 takes the instructions out of the bins based on data dependencies. During each clock cycle an instruction is taken from each bin in accordance with the second selection logic and sent to shift register 430 for assembling cache lines in the re-ordered instruction cache 136." (col. 6, lines 9-18).

Applicant also argued that "Branigin" does not teach scheduling of instructions to avoid pipeline stall before steering them into an instruction cache.

The reference teaches the scheduling of instructions to avoid pipeline stall by scheduling instructions for out-of-order execution (col. 7, line 12) before steering them into the reservation stations constituting the instruction cache.

From the descriptions in the specification, it is not clear what distinguishes the instruction cache from the reservation station of the reference, particularly when the instruction cache is used after the renaming stage.   The instruction cache bins appears to be a mere extension of the reservation station in the specification (in figs. 2 and 7) and behave exactly like reservation stations (in figs. 4, 5, and 9).

10.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth S KIM whose telephone number is (703) 305-9693. The examiner can normally be reached on M-F (8:30-17:00).
    If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Rinehart can be reached on (703) 305-4815. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-7239 for regular communications and (703) 746-7238 for After Final communications.
    Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

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July 25, 2003

KENNETH S. KIM
PRIMARY EXAMINER